

## **TUSK OR BONE?: AN EXAMPLE OF FAKE WALRUS IVORY IN THE WILDLIFE TRADE**

### **Identification Guides for Wildlife Law Enforcement No. 10**

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In recent years, forensic analysts examined several ivory tusks suspected to be walrus, a protected marine mammal. After careful examination, Lab analysts determined their origin as carved leg bones of a large hoofed mammal (probably cow.) Cattle bone is often used as a legal and ready source for bone material. In the lucrative international ivory trade, fakes and frauds are common.

The purpose of this identification guide is to provide wildlife law enforcement officers with descriptive information about fake tusks (and bone objects in general) for proper identification. A case example of fake tusks is described. The fakes are similar in size to authentic tusks and might be confused when initially examined (see Figures 1 and 2.)

Ivory (carvable dentine) has a higher component of mineralized tissue than bone. It appears smooth without visible texture irregularities. Unlike ivory, bone is highly vascularized. The microscopic capillaries within bone matrix give carved objects a “grainy” appearance. This microstructure visible with the naked eye is called the Haversian system. The fine pits and canals are naturally darker than the surrounding matrix, and are observed as fine dark spots, scratches, or streaking on a carved object (see Figure 3.) Compact bone is most often used as an ivory substitute. Cancellous bone, commonly found near the ends of long bones, has a sponge-like appearance and has much larger canals than smooth compact bone. It is the differences in these physical properties which distinguish ivory and bone when examining carved objects. Because the chemical components of both ivory and bone are basically the same, they both fluoresce when tested with UV light.

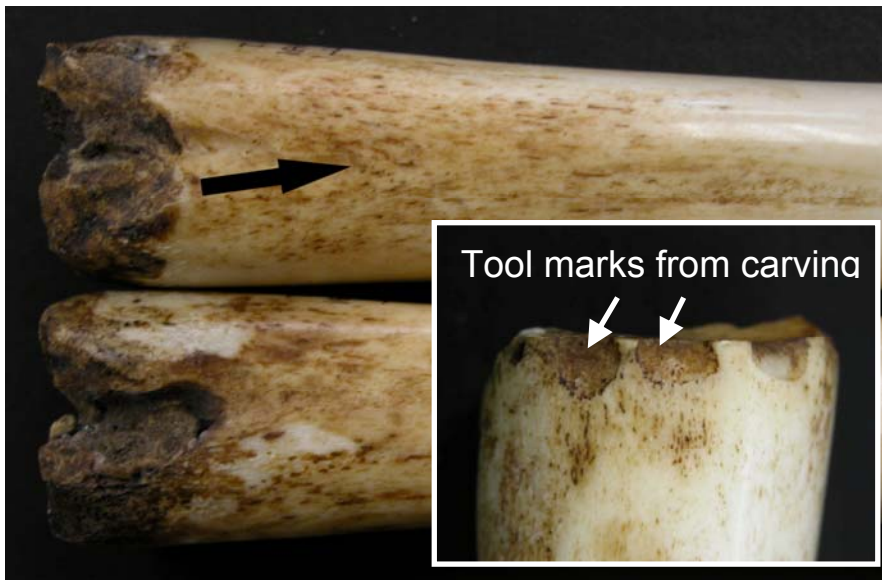


**Figure 1.** Small walrus tusk (top); fake tusk made of bone (bottom). The naturally long and straight leg bone has been cut, carved, filled, stained, and polished to closely resemble an unmodified walrus tusk.



**Figure 2.** Pair of fake ivory tusks (made of bone) as received in a shipment.

Although the size and color are similar to ivory tusks found in the wildlife trade, these bone “tusks” are readily recognizable as fake. There are no typical tusk features such as enamel, cementum, or a pulp cavity. The absence of prominent Schreger lines excludes extant and extinct elephants, the absence of secondary dentine excludes walrus, and the absence of ridges and fine concentric dentine rings excludes hippopotamus incisors.



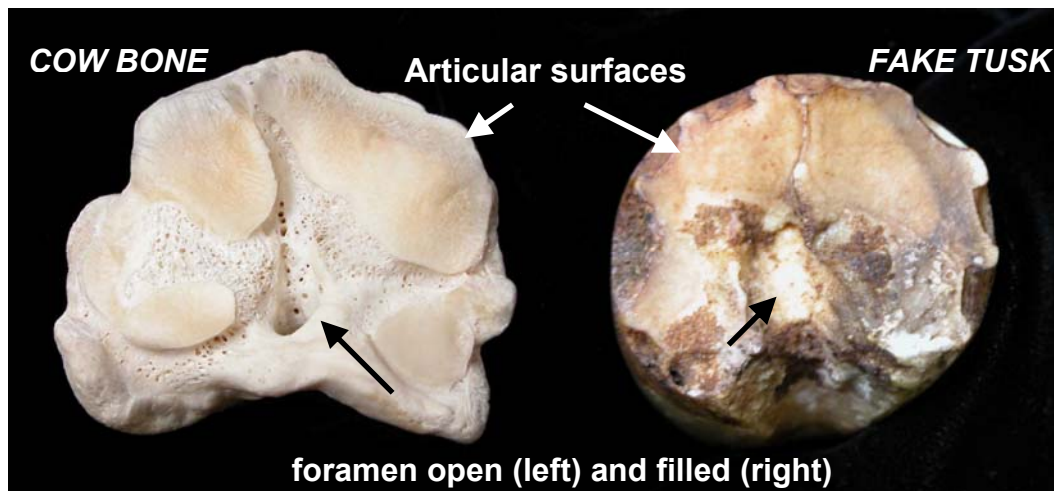
**Figure 3.** Diagnostic pitting on bone surface (fake tusk); Inset: tool marks

The Haversian system (natural pitting that appears like dark streaks on the surface) is diagnostic for bone and is clearly visible. The edges of the leg bone have been chiseled away, leaving remnants of the articular surface (joint surface) visible and exposing cancellous (spongy) bone as well.



**Figure 4.** Fake tusk made of bone (top); large mammal leg bone (bottom). Inset: Natural bone shaft filled with amalgam at the end to form a rounded tip (note color and texture change from left to right).

Both ends of the fake tusk have been modified (see Figures 3, 4, and 5.) The bone shaft has been carved and polished to obtain a smooth shiny surface. Small nutrient canals (or their remnants) are visible on the bone shaft. The distal end (with “knuckles”) has been removed and filled-in with an amalgam. A slight discoloration in material (and appearance of texture) reveals where the bone ends and the amalgam begins. The distal end was then rounded to form a tip and polished smooth. On the opposite end (see Figure 5) is the articular surface where the joint forms with the upper leg bone. Parts of this area have been chiseled away, and the foramen has been filled. The result is a tusk-like figure originally carved from a mammal leg bone.



**Figure 5.** Articular surface of lower leg bone of cow (left); articular surface on fake tusk made of bone.